

### **REMARKS**

The pending Office Action addresses claims 1, 3-6, 9, 10, 13-18, 20, 21, 24-28, 30-39, and 42-53. Claims 32 and 33 were previously withdrawn. The remainder of the pending claims stand rejected. Applicants respectfully request reconsideration of the present application in view of the following remarks.

#### ***Rejections Over Brekke***

Claims 1, 3-6, 9, 10, 13-18, 20, 21, 24-28, 30, 31, 34-39, and 42-53 are rejected pursuant to 35 U.S.C. §103(a) as being obvious over U.S. Patent No. 6,005,161 of Brekke et al. ("Brekke"). Applicants respectfully disagree.

#### **Claim 1**

Claim 1 recites a wedge-shaped porous tissue scaffold having a pocket containing a viable tissue having cells capable of migrating into the scaffold. The viable tissue comprises naturally occurring cells and their extracellular matrix, and the viable tissue is minced to form finely minced tissue fragments.

With reference to the claim recitation "viable tissue comprising naturally occurring cells and their extracellular matrix," the Examiner maintains that Applicants' use of the term comprising "is inclusive or open-ended and does not exclude additional, unrecited elements." *July 29, 2009 Office Action*, page 6. Applicants agree, nonetheless the claim affirmatively requires that a pocket of the scaffold contain, at a minimum, naturally occurring cells and their extracellular matrix minced to form finely minced tissue fragments.

Brekke does not bar the patentability of claim 1 because Brekke fails to teach or even suggest any composition containing at least naturally occurring cells *and* their extracellular matrix that is minced to form finely minced tissue fragments and contained within a pocket of the scaffold. In rejecting claim 1, the Examiner cites the following passage at column 10, lines 17-26:

In the repair of articular cartilage lesions according to the preferred teachings of the present invention, the chemotactic ground substance which in the preferred form is an RGD attachment moiety of fibronectin, the biologically active portion of proteins that function to attach cells, can be carried by the porous macrostructure and specifically

can be located in the voids and carried by and separate from the biodegradable polymer preformed into the gross structure, with the voids interconnecting and communicating with all the others and substantially the entire exterior of the gross structure, with the biodegradable polymer being preformed into the gross structure prior to the introduction of the chemotactic ground substance.

This passage, however, is directed to ground chemotactic substances such as hyaluronic acid and fibronectin that are carried by the porous macrostructure. *See* col. 10, lines 13-14. This passage fails to meet the recitations of claim 1 because the compositions that are ground are glycosaminoglycans (hyaluronic acid) or glycoproteins (fibronectin), and not naturally occurring cells and their extracellular matrix.

The Examiner also argues that the following passage at column 10, lines 42-49 of Brekke discloses minced viable tissue within pockets of the scaffold:

In the repair of articular cartilage, the biodegradable graft substitute device acts as a carrier for cells which have demonstrated the ability to differentiate into cartilage cells, i.e. bone marrow, periosteal, or perichondrial cells, with the latter being preferred. Further, such cells should be blastic, i.e. prepared to divide and produce repair tissue, as opposed to cells which are already differentiated such as cells from articular cartilage.

This passage, however, fails to teach or even suggest that the “cells which have demonstrated the ability to differentiate into cartilage cells” are *minced* with their extracellular matrix to form finely minced tissue fragments that are contained within a pocket of the scaffold. Rather, Brekke teaches that 1) a *tissue slice* containing the precursor cells is sutured to an *external surface* of the porous scaffold, or 2) the precursor cells are *isolated from their extracellular matrix* and seeded onto the porous scaffold. *See* col. 11, lines 14-17, 30-58.

In the first embodiment, the precursor cells and their extracellular matrix are neither minced to form finely minced tissue fragments nor contained within a pocket of the scaffold. Rather, as shown in Figure 7 of Brekke, the *tissue slice* is cut to the size of the biodegradable device and sutured to an *outer surface* of the device. Further, this embodiment of Brekke does not even suggest mincing tissue because minced tissue fragments could not be *sutured* to a surface of the device as taught by Brekke. Accordingly, Brekke fails to teach a viable tissue comprising *naturally occurring cells and their extracellular matrix* that is *minced to form finely minced tissue fragments* contained within a pocket of a tissue scaffold, as required by claim 1.

With reference to the second embodiment of Brekke wherein the porous scaffold is seeded with free cells, Brekke discloses isolating the precursor cells from their extracellular matrix by “1) placing the precursor tissue in culture and allowing the cells to *proliferate out of the tissue*, or 2) digesting the tissue with collagenase, thereby *freeing the cells*, which in turn are placed in the culture medium and grown.” Col. 11, lines 42-49 (emphasis added). Accordingly, Brekke does not contemplate mincing the precursor tissue, but instead discloses “allowing the cells to proliferate out of the tissue” or “digesting the tissue.” Further, the precursor cells are isolated from the precursor tissue such that the suspension seeded on the porous scaffold is a suspension of cultured *free cells that are lacking their extracellular matrix*. Even if the precursor cells generate “repair tissue” once seeded on the scaffold, claim 1 requires that the pocket contains finely minced fragments of viable tissue (i.e., cells and their extracellular matrix that have been finely minced). Thus, any extracellular matrix generated by the precursor cells of Brekke following attachment to the scaffold fails to meet the recitations of claim 1 because this generated extracellular matrix is unprocessed (i.e., not minced). Accordingly, Brekke fails to teach a viable tissue comprising *naturally occurring cells and their extracellular matrix* that is *minced to form finely minced tissue fragments* contained within a pocket of a tissue scaffold, as required by claim 1.

Claim 1 therefore distinguishes over Brekke and represents allowable subject matter. Claims 3-6, 9, 10, 42, and 43, which depend therefrom, are allowable at least because they depend from an allowable base claim.

### Claim 13

Claim 13 recites a viable tissue disposed within a pocket of the tissue scaffold, wherein the viable tissue comprises naturally occurring cells and their extracellular matrix and the viable tissue is finely minced to form minced tissue fragments. As discussed above with reference to claim 1, Brekke fails to teach *naturally occurring cells and their extracellular matrix finely minced to form minced tissue fragments* within a pocket of a tissue scaffold. Accordingly, claim 13 distinguishes over Brekke and represents allowable subject matter. Claims 14-18, 20, 21, and 44-47, which depend therefrom, are allowable at least because they depend from an allowable base claim.

Claim 24

Claim 24 recites obtaining a viable tissue comprising naturally occurring cells and their extracellular matrix, mincing the viable tissue to form finely minced tissue particles, and loading the viable tissue into a pocket of the scaffold. As discussed above with reference to claim 1, Brekke fails to teach mincing a viable tissue comprising naturally occurring *cells and their extracellular matrix* to form *finely minced tissue particles*. Accordingly, claim 24 distinguishes over Brekke and represents allowable subject matter. Claims 25-28, 30, 31, 48, and 49, which depend therefrom, are allowable at least because they depend from an allowable base claim.

Claim 34

Claim 34 recites a method for repairing defective tissue comprising obtaining a viable tissue comprising naturally occurring cells and their extracellular matrix and preparing the viable tissue to form finely minced tissue fragments. As discussed above with reference to claim 1, Brekke fails to teach preparing a viable tissue to form *finely minced tissue fragments*. Accordingly, claim 34 distinguishes over Brekke and represents allowable subject matter. Claims 35-39 and 50-53, which depend therefrom, are allowable at least because they depend from an allowable base claim.

***Rejections Over Schwartz***

Claims 1, 3-6, 9, 10, 13-18, 20, 21, and 42-47 are rejected pursuant to 35 U.S.C. §102(e) as being anticipated by U.S. Patent Application Publication No. 2003/78617 of Schwartz et al. ("Schwartz"). Claims 1, 3-6, 9, 10, 13-18, 20, 21, 24-28, 30, 31, 34-39, and 42-53 are also rejected pursuant to 35 U.S.C. §103(a) as being obvious over Schwartz.

Claim 1

The Examiner asserts that the claim recitation "viable tissue comprising naturally occurring cells and their extracellular matrix" does not "exclude the use of other elements." *July 29, 2009 Office Action*, page 7-8. As discussed above, Applicants agree however claim 1 nonetheless requires that the viable tissue that is minced to form finely minced tissue fragments contained within a pocket of the scaffold include, at a minimum, *naturally occurring cells and their extracellular matrix*. Schwartz fails to teach or even suggest any composition containing *at least naturally occurring cells*

*and their extracellular matrix* that is *minced* to form finely minced tissue fragments and contained within a pocket of the scaffold.

Although the Examiner argues that the “comminuted ECM material” disclosed by Schwartz meets the recitations of claim 1, Schwartz does not teach or even suggest that the material that is comminuted contains the *cells* that have produced the extracellular matrix material. Rather, at paragraph [0083], Schwartz explicitly provides that “naturally occurring ECM” refers to “*extracellular matrix material* that has been cleaned, disinfected, sterilized, and optionally cross-linked,” and there is no indication in Schwartz that the material that is comminuted contains anything other than extracellular matrix. Rather, one of skill in the art would understand from this passage of Schwartz that comminuted ECM material is exactly that – an extracellular (i.e., outside the cell) material that has been comminuted.

The Examiner further argues that “naturally occurring cells are used in the implantable scaffold of Schwartz and thus these cells clearly migrate and populate the scaffold. Second since they are living cells they clearly are populating the scaffold and regenerating their extracellular matrix.” *July 29, 2009 Office Action*, page 7. The Examiner’s argument is irrelevant because claim 1 requires that a pocket contain finely *minced* fragments of viable tissue (i.e., *cells and their extracellular matrix* that have been finely minced). Even if the purified cells of Schwartz to which the Examiner refers populate the scaffold and generate extracellular matrix, claim 1 distinguishes over Schwartz because the purified cells of Schwartz are not minced *with their extracellular matrix* to form tissue fragments that are contained within a pocket of the scaffold. Any “new” extracellular matrix generated by the cells following implantation would be unprocessed (i.e., not minced). Because the only material that Schwartz discloses comminuting is acellular, extracellular matrix material, Schwartz fails to teach a viable tissue comprising *naturally occurring cells and their extracellular matrix* that is *minced to form finely minced tissue fragments* contained within a pocket of a tissue scaffold, as required by claim 1.

Accordingly, claim 1 distinguishes over Schwartz and represents allowable subject matter. Claims 3-6, 9, 10, 42, and 43, which depend therefrom, are allowable at least because they depend from an allowable base claim.

Claim 13

As discussed above, Schwartz fails to teach a viable tissue comprising naturally *occurring cells and their extracellular matrix* within a pocket of a tissue scaffold, wherein the viable tissue is *finely minced to form minced tissue fragments*. Accordingly, claim 13 distinguishes over Schwartz and represents allowable subject matter. Claims 14-18, 20, 21, and 44-47, which depend therefrom, are allowable at least because they depend from an allowable base claim.

Claim 24

As discussed above, Schwartz fails to teach mincing a viable tissue comprising naturally *occurring tissue and their extracellular matrix to form finely minced tissue particles*. Accordingly, claim 24 distinguishes over Schwartz and represents allowable subject matter. Claims 25-28, 30, 31, 48, and 49, which depend therefrom, are allowable at least because they depend from an allowable base claim.

Claim 34


As discussed above, Schwartz fails to teach preparing a viable tissue to form *finely minced tissue fragments*. Accordingly, claim 34 distinguishes over Schwartz and represents allowable subject matter. Claims 35-39 and 50-53, which depend therefrom, are allowable at least because they depend from an allowable base claim.

***Conclusion***

In conclusion, Applicants submit that all claims are now in condition for allowance, and allowance thereof is respectfully requested. The Examiner is encouraged to telephone the undersigned attorney for Applicants if such communication is deemed to expedite prosecution of this application.

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Respectfully submitted,

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